CLASSIFICATION CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

50X1-HUM

COUNTRY	USSR	DATE OF INFORMATION	1949
SUBJECT	Scientific - Engineering, liquid oxygen production	DATE DIST.	29 Aug 1950
HOW PUBLISHED	Book		
WHERE PUBLISHED	Moscow	NO. OF PAGES	2
DATE PUBLISHED	1949		
LANGUAGE	Russian	SUPPLEMENT TO REPORT NO.	

THIS IS UNEVALUATED INFORMATION

SOURCE Glubokoye Okhlazhdeniye (Cooling to Extremely Low Temperatures), Vol II, Part II, 2d Revised Edition, Soviet Science State Press, (LC No QC278 · G4).

EQUIPMENT FOR LIQUID OXYGEN PRODUCTION USED IN THE USSR

S. Ya. Gersh

The production of units permitting cooling to extremely low temperatures was begun in the USSR in 1932. The first USSR installation for the production of liquid oxygen and oxygen gas was designed by Professors S. Ya. Gersh, N. A. Dollezhal', and N. S. Semikhatov, in collaboration with Engineers P. M. Kamenev and G. I. Burko. It had a capacity of 250 cubic meters of oxygen per hour. The compressors and separators operated satisfactorily, and this installation was used as a model for designing other installations having capacities of 30 cubic meters and 130 cubic meters of oxygen per hour, and also for designing high-pressure compressors. Construction of high-capacity equipment for liquid-oxygen production has now been completely mastered in the USSR. The design of the most recent constructions embodies original flowsheets and improvements which in many cases represent a higher degree of technical perfection than that demonstrated by similar work done abroad.

Glavkislorod (Main Oxygen Administration) supplies equipment of all three capacities mentioned above. The characteristics of the Glavkislorod oxygen installations are listed in the appended table. It can be seen that the relative amount of nonferrous metals is much greater in a K-250 installation than in a K-130 installation, indicating an excessive spare surface in the heat exchangers and condenser. The oxygen installations of Glavkislorod, although reliable and efficient, are nevertheless out of date and too heavy as far as their construction is concerned. At present VNIIKIMASh [All-Union Scientific Research Institute for Construction and Design of Equipment] has constructed and tested several new installations having capacities of 300 and 1,000 cubic meters of oxygen gas per hour and 1,000 kilograms of liquid oxygen per hour. These installations exhibit great originality in production flowsheet and construction and, furthermore, are distinguished by their compactness and economy in power requirements. The expenditure of energy in installations having capacities of 300 and 1,000 cubic meters of oxygen gas per hour comprises N_e equals 0.62 kilowatt hour per cubic meter of oxygen. The installations are equipped with acetylene filters of the type proposed by I. Ishkin and P. Burbo, which serve as a safety device preventing explosions.

CLASSIFICATION CONFIDENTIAL

STATE	X	NAVY	X	NSRB	DISTRIBUTION
ARMY	X	AIR	X	FBI	

[In another part of the book, an installation equipped with a regenerator and a turbo-pressure reducer of the Linde-Fraenkel type is described. It has an output of 3,500 cubic meters of 97-percent oxygen per hour. Equipment of this type is referred to by the author as showing a high productivity in the individual stages, and as based on experimental work carried out in Germany in 1932 on installations embodying regenerators. By using an installation of this type, a considerable economy in the expenditure of power per cubic meter of oxygen can allegedly be achieved. A schematic drawing of this installation shows an acetylene separator, and a work drawing and brief description of an acetylene separator are given later in the text].

Equipment of this construction is now being supplied in capacities of 1,000 to 3,500 cubic meters of oxygen per hour and produces oxygen reaching a purity of 99-99.5 percent and nitrogen in a concentration of 99.8 percent. The expenditure of energy on the compressor shaft is N_e equals 0.45 kilowatt hour per cubic meter of 98-percent oxygen. The practical expenditure of energy, taking into account all auxiliary plant requirements including illumination, amounts to N_e equals 0.535-0.56 kilowatt hour per cubic meter of 98-percent oxygen.

Characteristics of Oxygen Installations Supplied by Glavkislorod

Type of Installation	Unit	K-30	K-130	K-250
Rated output	Cu m O_2/hr	30	130	250
Oxygen concentration	%	99-99.5	99-99.5	99-99.5
Expenditure of energy necessary for production of O_2 gas *	Kw-h/cu m O_2	1.6	1.5	1.45
	Kwh/kg O_2	1.33	1.26	1.26
Expenditure of energy necessary for production of liquid O_2	Kw-h/cu m O_2	1.9	1.8	1.8
Expenditure of nonferrous metals	Kg	-	1490	4630
Same, per cu m of O_2	Kg	-	11.5	18.5
Expenditure of ferrous metals	Kg	-	6900	13860
Same, per cu m of O_2	Kg	-	53	55.5
Expenditure of water	Cu m/kg O_2	-	0.1	0.1
Duration of starting period	Hr	8-10	8-10	8-10

* Including the amount of energy used for oxygen compression.

- E N D -